REMARKS

The examiner rejected claims 15 and 27 under 35 U.S.C. 102(b) as being anticipated by Saeki et al. (U.S. Patent # 5,610,450).

Claim 15 is allowable over Saeki, since the reference neither describes nor suggests delivering energy from a primary cell to a rechargeable cell, the rechargeable cell being an Li-Ion or Li-Polymer rechargeable cell with the energy delivered through a switching type DC/DC boost type converter at a fixed voltage that is less than the full charge voltage of the rechargeable cell.

The examiner stated:

> **Saeki et al. disclose the claimed invention a power supply (figure I), including a primary cell (figure 1, item 21), a rechargeable cell (figure 1, item 21), an Li-Ion cell (column 4, line 35-40), a fixed output (Abstract, line 10-1 5) and less than the full charge (column 5, line 55-65).**

Applicant asks how can Saeki et al. disclose the claimed invention when Saeki et al. discloses 21 as "a chargeable battery" [Saeki col. 4 lines 38-39], not "a primary cell (figure 1, item 21)," as contended by the examiner. Moreover, the examiner readily admits that since the examiner uses item 21 in Saeki as disclosing both the primary cell and the rechargeable cell.

Claim 1 further distinguishes over Saeki et al, since the reference fails to disclose, delivering energy from a primary cell to a rechargeable cell *** with the energy delivered through a switching type DC/DC boost type converter at a fixed voltage that is less than the full charge voltage of the rechargeable cell.

The examiner contends that Saeki teaches fixed output (Abstract, line 10-1 5) and "less than the full charge (column 5, line 55-65)."

Saeki in the Abstract discusses that a booster type DC-DC conversion circuit and a voltage reduction type DC-DC conversion circuit are connected in series with a battery. Saeki discusses that when battery voltage is high, the booster type DC-DC conversion circuit does not operate and the voltage reduction type DC-DC conversion circuit outputs a constant voltage lower than the battery voltage. In Saeki, when the battery voltage drops the booster DC-DC

conversion circuit operates to converts the remaining battery voltage to a voltage that is higher than the operation voltage of the voltage reduction type DC-DC conversion circuit so that the voltage reduction type DC-DC conversion circuit can output the constant voltage to more efficiently utilize the battery capacity. Saeki also fails to teach "less than the full charge (column 5, line 55-65)."

At Col. 5 lines 55-66 Saeki discloses:

> ***** from the DC-IN connector 20 is "1", and the output of the NAND circuit 22c is "0" without depending on other signals. Therefore, the booster type DC-DC conversion circuit 23 stops its operation. The charger 25 starts its charging operation upon detection that the voltage of the battery 21 drops below the rated value.**
>
> **When external power is not supplied from the DC-IN connector 20, power is supplied from the built-in battery 21 to the voltage reduction type DC-DC conversion circuit 24 through the diode D2. When the voltage of the battery is higher than the operation voltage of the voltage reduction type DC-DC conversion circuit 24, the voltage comparator 22b of the detection circuit 22 outputs the "1" signal**

As with the excerpt from the Abstract, Saeki fails to disclose: "delivering energy from a primary cell to a rechargeable cell *** with the energy delivered through a switching type DC/DC boost type converter at a fixed voltage that is less than the full charge voltage of the rechargeable cell." Rather, Saeki discloses conditions under which the booster type DC-DC conversion circuit stops operation. Saeki says nothing about "delivering energy from a primary cell to a rechargeable cell *** with the energy delivered through a switching type DC/DC boost type converter at a fixed voltage that is less than the full charge voltage of the rechargeable cell."

Saeki does say that "The charger 25 starts its charging operation upon detection that the voltage of the battery 21 drops below the rated value.", but that still does not describe that the "witching type DC/DC boost type converter at a fixed voltage that is less than the full charge voltage of the rechargeable cell." In contrast, Saeki clearly discloses in the previous sentence when that condition is met that: "Therefore, the booster type DC-DC conversion circuit 23 stops its operation." Accordingly, if the booster DC-DC circuit 23 in Saeki stops operation, it cannot

meet the limitation of "delivering energy from a primary cell to a rechargeable cell *** through a switching type DC/DC."

Claim 27 is allowable over Saeki, since Saeki neither describes nor suggests a switching type DC/DC boost type converter that receives energy from a primary battery cell and is arranged to deliver the energy to a rechargeable cell, the DC/DC converter having a feedback input set to provide a fixed output voltage that is less than the full charge voltage of the rechargeable cell and a pair of external resistors coupled to the feedback input of the converter to adjust the fixed output voltage to be less than the full charge voltage of the rechargeable cell.

The examiner rejected claim 10 under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. Patent # 5,986,437) in combination with Payne (U .S. patent # 5,309,082).

The examiner contends that:

> **Lee discloses claimed invention a switching DC/DC boost type converter (figure 2 and 4-5), including a primary cell (figure 5, item 4), a rechargeable cell (figure 5, item 8), a control circuit (figure 5, item microcomputer), a feedback and charge control (column 3, line 65-67 and column 4, line I-50). However Lee does not disclose the utilization of the technique for a resistor voltage divider ratio at the feedback input and a hybrid power supply. Payne teaches the utilization of the similar technique for a resistor voltage divider ratio at the feedback input (column 2, line 35-50 and column 3, line 30-65) and a hybrid power supply (column 2, line 14-20). It would have been obvious one having an ordinary skill in the art at the time the invention made to modify Lee 's power supply by utilizing the technique taught by Payne for the purpose of increasing efficiency of the power supply.**

Claim 10 requires a switching type DC/DC boost type converter that receives energy from a primary cell with the primary cell being an alkaline cell, Zn-air cell, fuel cell, solar cell, or another current limited DC power source, and is arranged to deliver the energy to a rechargeable cell ** a resistor voltage divider *** having resistor voltage divider ratio selected to provide a voltage at the feedback input, to control the DC/DC converter to provide an output voltage that is less than the full charge voltage of the rechargeable cell.

Lee in combination with Payne fails to suggest at least the foregoing features of claim 10. Contrary to the position taken by the examiner, Lee does not disclose that the DC/DC boost type converter receives energy from a primary cell. In Lee, the DC/DC converter receives energy from the AC adapter not from a primary cell. In addition, Lee discloses that the DC/DC

converter is used to supply power to the system unit 20, not "to deliver the energy to a rechargeable cell," as in claim 10.

The examiner admits that Lee fails to: "*** disclose the utilization of the technique for a resistor voltage divider ratio at the feedback input and a hybrid power supply." The examiner relies upon Payne for this teaching.

Applicant contends that Payne also fails to disclose or suggest the feature recited in claim 10. Payne teaches to use feedback to provide a voltage control signal to control a linear regulator. Payne fails to suggest a resistor voltage divider *** having resistor voltage divider ratio selected to provide a voltage at the feedback input, to control the DC/DC converter to provide an output voltage that is less than the full charge voltage of the rechargeable cell. Accordingly, the combination of Lee and Payne neither describes nor suggests the invention.

Moreover, Applicant contends that there is no motivation to combine the teachings of Lee and Payne. The examiner contends that: "It would have been obvious one having an ordinary skill in the art at the time the invention made to modify Lee 's power supply by utilizing the technique taught by Payne for the purpose of increasing efficiency of the power supply."

Lee already has a voltage divider R162/R163 that sets a bias on a terminal of U161. Lee however does not suggest that the DC/DC converter 10 charges a cell as in claim 1, but rather Lees teaches that the DC/DC converter supplies power to the system unit 20. One of ordinary skill in the art would not be motivated to look to Payne to teach what is already disclosed in Lee (a voltage divider) and modify an input to the DC/DC converter, where Lee fails to show the DC/DC converter arranged to deliver energy to a rechargeable cell."

The examiner rejected claims 14, 16-17, 19-26 and 28-38 under 35 U.S.C. 103(a) as being unpatentable over Saeki et al. (U.S. Patent # 5,986,437) in combination with Lee (U.S. patent # 5,986,437).

The examiner stated:

> **Saeki et al. disclose the claimed invention a boost type DC/DC converter (figure 1), a primary cell (figure 1, item 20) and secondary cell (figure 1, item 21 and column 4, line 35-40), a 90 % of charge (column 1, line 60-68). However Saeki et al. does not disclose the utilization of the technique for a circuit that senses primary battery current. It would have been obvious one having an ordinary skill in the art**

> **at the time the invention was made to modify Saeki et al.'s power supply by utilizing the technique taught by Lee for the purpose of providing protection to battery.**
>
> **In regards to claims 20, 29, 32 Saeki et al. in combination with Lee disclose the utilization an operational amplifier with primary battery current sensing resistor (Lee's figure 5, item U161).**
>
> **In regards to claims 24-26,30-31 ,Saeki et al. disclose the claimed invention except an alkaline cell, Zn-air cell or fuel cell. It would have been obvious one ~~having ordinary skill in the art at the time the invention was made to utilize DC~~ connector or AC adapter since examiner takes official notice of equivalence of an alkaline cell, Zn-air cell or fuel cell for their use in the art and the selection of these known equivalent to power supply would be within the level of ordinary skill in the art.**

Applicant contends that these claims are allowable over the references at least for the reasons discussed in conjunction with the base claims.

Claim 14 recites that the switching type DC/DC boost type converter delivers an output voltage that corresponds to about 90% of the charge voltage of the rechargeable cell. Saeki et al. does not disclose the claimed invention including the features of the base claim. Contrary to the examiner's position, Saeki also fails to disclose "a 90 % of charge."

Saeki at column 1, line 60-68 discusses

> **In this case, though the battery has the capacity to discharge down to 5.0 V, the remaining 1.0 V cannot be used. There is a difference of about 10% between the case where this battery is discharged to 5.0 V and the case where discharge is stopped at 6.0 V. Therefore, if the Li+ battery is used for the voltage reduction type DC-DC conversion circuit requiring the 5.0 V output, only about 90% of the battery capacity can be used and the remaining about 10% becomes useless. In other words, there remains the problem that the battery cannot be used at maximum efficiency.**

However, this is not what Applicant has claimed. Rather, Applicant claim 14 recites that: "the switching type DC/DC boost type converter delivers an output voltage that corresponds to about 90% of the charge voltage of the rechargeable cell." That is, while Saeki discloses discharge of the battery, Applicant claims using the switching type DC/DC boost type converter to provide an output voltage that corresponds to about 90% of the charge voltage of the rechargeable cell.

Claim 16 recites controlling a circuit that senses primary battery current, and controls in part operation of the converter to provide a constant current discharge on the primary battery side of the hybrid power supply. This feature is not disclosed by the combination of Saeki and Lee.

Regarding claims 20, 29, 32 Saeki et al. in combination with Lee fails to disclose all of the features of these claim as discussed above, and fails to disclose "an operational amplifier with a primary battery current sensing resistor to provide primary battery current control with the output of the amplifier coupled in a closed feedback loop of the DC/DC converter and the closed feedback loop of the converter further comprises a resistor coupled between output and feedback terminals of the converter." Lee's figure 5, item U161 does not disclose this arrangement. Lee does not disclose an operation amplifier in the feedback loop of the DC/DC converter.

In regards to claims 24-26, 30-31, these claims are allowable over Saeki et al. and the other references, since the references fail to disclose the claimed elements of the base claims.

The examiner is also incorrect in that there is no suggestion to one having ordinary skill in the art to use a either DC connector or AC adapter. Essentially, the examiner fails to show why one of ordinary skill would be motivated to modify the Saeki et al reference in view the examiner's incorrect official notice that equivalence of DC or AC sources.

Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: 8/19/04

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